

**Commonwealth of Kentucky**  
**Division for Air Quality**  
***PERMIT STATEMENT OF BASIS***

*(For permits requiring public notice)*

Title V Draft/Proposed Permit No. V-98-017

WESTVACO CORPORATION, CHEMICAL DIVISION

WICKLIFFE, KENTUCKY

June 7, 2000

REVIEWING ENGINEER - KUMAR POLE, P.E.

Plant I.D. # 072-0100-0012

Application Log # F728

**A. SOURCE DESCRIPTION:**

Westvaco Corporation, Chemical Division (hereafter referred to as 'Westvaco') operates an activated carbon manufacturing plant in Wickliffe, Kentucky. The facility has an SIC code of 2819 and produces activated carbon products used in onboard vapor recovery systems and as speciality carbon catalyst. The facility is also permitted to operate a production line for extruded carbon products but this line has not been constructed yet.

The facility is an existing major source for carbon monoxide, nitrogen oxides, particulate matter (PM<sub>10</sub>), volatile organic compounds (VOCs), and single & combined hazardous air pollutants (HAPs). On February 9, 1996, Westvaco received a permit [F-96-001] to construct and operate a new activated carbon manufacturing facility in Wickliffe, Kentucky. The facility was permitted as a PSD source and was subject to an ambient air quality impact review and BACT analysis. On June 27, 1996, the permit was revised [F-96-001 (Revision 1)] to include changes to the PSD permit.

Although the original permit met Title V requirements, there have been substantial changes to Kentucky's Title V permit format since the date of original issuance. Furthermore, with the current application, Westvaco is requested significant revisions to the existing permit which require public and U.S. EPA review. Therefore, the division has made a decision to re-issue the permit for the entire Westvaco carbon plant in the most current Title V permit format. The proposed permit will be issued as a Title V permit superseding the existing plant-wide permit. The proposed permit is subject to all Title V public, affected states, and U.S. EPA review procedures.

**B. COMMENTS:**

1. Types of control and efficiency:

EP#	Affected Facility	Pollutant	Control Technology	Control Level	Emission Level (lb/hr)
01	Woodbase Carbon Sawdust Delivery / Handling:				
		PM/PM <sub>10</sub>	Enclosures, wet suppression, surface treatment	NA (fugitive emissions)	1.17 / 0.24

EP#	Affected Facility	Pollutant	Control Technology	Control Level	Emission Level (lb/hr)
02	Woodbase Carbon Acid / Sawdust Mixing / Activation Kiln / Acid Recovery System:				
		Furfural	Afterburner	91%	32.90
		CO	Afterburner	95%	82.74
		NOx	Low NOx Burners: Activation Kiln - Afterburner -	(lb/mmBTU) 0.13 0.30	41.60
		Phosphoric Acid PM/PM <sub>10</sub>	Venturi Scrubber	0%	13.80 (H <sub>3</sub> PO <sub>4</sub> ) 14.60 (PM/PM <sub>10</sub> )
			Wet Fan Demister	40%	
			Reverse Jet Scrubber	70%	
			Brinks Mist Eliminator	94%	
		VOC	Afterburner	95%	122.69
03	Woodbase Carbon Drying / Screening / Grinding / Packaging:				
		CO	None	NA	5.64
		NOx	Low NOx Burner: Drying Kiln	(lb/mmBTU) 0.10	4.00
		PM/PM <sub>10</sub> ; Dryer Screening, etc.	Baghouse Cartridge Filter	99% 99%	6.75
		VOC	None	NA	0.11
04	Woodbase Carbon Bulk Storage Tanks / Rail Shipment:				
		PM/PM <sub>10</sub>	Cartridge Filter	99%	0.50
07	Catalyst Carbon Preheaters / Reactors:				
		CO	Afterburner	95%	19.29
		NOx	Low NOx Burner: Afterburner	(lb/mmBTU) 0.10	6.60
		Phosphoric Acid PM/PM <sub>10</sub>	Preheaters only:		2.07 (H <sub>3</sub> PO <sub>4</sub> ) 2.19 (PM/PM <sub>10</sub> )
			Venturi Scrubber and Packed Bed Scrubber	90%	
			Preheaters and Reactors:		
			Rotoclone Scrubber	90% (H <sub>3</sub> PO <sub>4</sub> ) 30% (PM/PM <sub>10</sub> )	
			Reverse Jet Scrubber	70%	
		VOC	Afterburner	95%	3.97

EP#	Affected Facility	Pollutant	Control Technology	Control Level	Emission Level (lb/hr)
08	Catalyst Plant Storage and Feed System, Product Finishing, Storage and Shipping:				
		PM/PM <sub>10</sub> : Storage Feed System Finishing, etc	Cartridge Filter Cartridge Filter Cartridge Filter	99% 99% 99%	1.50
10	Extruded Carbon Storage / Feed / Mixing / Extrusion:				
		PM/PM <sub>10</sub>	Cartridge Filter	99%	0.94
11	Extruded Carbon Vibrating Fluidized Bed Dryer:				
		CO	None	NA	0.05
		NOx	Low NOx Burner: Dryer	(lb/mmBTU) 0.10	0.20
		PM/PM <sub>10</sub>	Rotoclone Scrubber	98%	1.27
		VOC	None	NA	0.01
12	Extruded Carbon Activation Kiln (1 Direct Burner):				
		CO	None	NA	0.04
		NOx	Low NOx Burner: Activation Kiln	(lb/mmBTU) 0.10	0.15
		PM/PM <sub>10</sub>	Rotoclone Scrubber	98%	3.30
		VOC	None	NA	0.01
15	Extruded Carbon Activation Kiln (19 Indirect Burners):				
		CO	None	NA	0.18
		NOx	Low NOx Burners: Each indirect burner	(lb/mmBTU) 0.10	0.45
		PM/PM <sub>10</sub>	None	NA	0.05
		VOC	None	NA	0.05
13	Extruded Carbon Finishing System:				
		PM/PM <sub>10</sub>	Cartridge Filter	99%	0.38
14	Hydrochloric Acid Delivery / Storage:				
		HCl	Packed Bed Scrubber	98%	0.01
16	Lime Storage / Feed System:				
		PM/PM <sub>10</sub>	Cartridge Filter	99%	0.30

2. Emission factors and their source:

Air emissions are generated from sawdust delivery and handling, carbon activation, carbon drying, catalyst carbon production, extruded carbon production, carbon screening / grinding / packaging / finishing process, lime storage and feed, and hydrochloric acid delivery and storage.

- i. The majority of the emissions estimates for the process sources have been based on local plant testing performed at a similar carbon plant operated by Westvaco in Covington, Virginia. Additional emission factors were developed through pilot plant testing.
- ii. Emissions resulting from the combustion of natural gas have been based on AP-42 emission factors with the exception of NO<sub>x</sub> emissions which have been based on low NO<sub>x</sub> burner ratings supplied by burner vendors.
- iii. Estimates of the fugitive dust emissions from the sawdust delivery and handling processes were based on AP-42 procedures described in Section 13.2

3. Applicable regulations:

- i. 401 KAR 51:017 (40 CFR 52.21), *Prevention of significant deterioration of air quality*, applies to the following emission points -

**Woodbase Plant Sources:**

- |    |         |  |
|----|---------|--|
| 01 | (EP010) | Woodbase Carbon Sawdust Delivery/Handling                              |
| 02 | (EP020) | Woodbase Carbon Acid/Mixing, Activation Kiln, and Acid Recovery System |
| 03 | (EP030) | Woodbase Drying/Screening/Grinding/Packaging                           |
| 04 | (EP040) | Woodbase Bulk Storage Tanks and Rail Shipment                          |

**Catalyst Plant Sources:**

- |    |         |   |
|----|---------|---|
| 07 | (EP070) | Catalyst Plant Preheaters and Reactors  |
| 08 | (EP080) | Catalyst Plant Storage and Feed System, Product Finishing, Storage and Shipping |

**Extrusion Plant Sources:**

- |    |         |   |
|----|---------|---|
| 10 | (EP100) | Extrusion Plant Storage, Feed, Mixing, and Extrusion System |
| 11 | (EP110) | Extrusion Plant Fluidized Bed Dryer                         |
| 12 | (EP120) | Extrusion Plant Activation Kiln                             |
| 15 | (EP120) | Extrusion Plant Activation Kiln Indirect Burners            |
| 13 | (EP130) | Extrusion Plant Finishing System                            |

**Miscellaneous Sources:**

- |    |         |                              |
|----|---------|------------------------------|
| 16 | (EP150) | Lime Storage and Feed System |
|----|---------|------------------------------|

Regulation 401 KAR 59:010, *New Process Operations*, also applies to each of these emission points except Emission Point #01 (EP010). However, the mass emission standards for particulate matter prescribed by 51:017 are more stringent than those under 59:010. Hence, the mass emission standards for particulate matter under 59:010 are superseded by 51:017 for every emission point listed above. The opacity standard under 59:010 continues to apply.

- ii. 401 KAR 63:010, *Fugitive emissions*, applies to the Sawdust Delivery/Handling activities (EP# 01). The standards prescribed by 63:010 are similar to those under 51:017 and therefore, both regulations continue to apply to these activities.
  - iii. 401 KAR 63:020, *Potentially hazardous matter or toxic substances*, applies to the phosphoric acid and furfural emissions from the No. 12 Activation Kiln (EP# 02).
4. Anything unusual about the:
- i. Emission points (number and description) - No
  - ii. Regulations that are not applicable - No

**C. PSD REVISION REVIEW:**

1. Applicability

On February 9, 1996, Westvaco received a permit [F-96-001] to construct and operate a new activated carbon manufacturing facility in Wickliffe, Kentucky. The facility was permitted as a PSD source and was subject to an ambient air quality impact review and BACT analysis. On June 27, 1996, the permit was revised [F-96-001 (Revision 1)] to include changes to the PSD permit.

Following startup of the carbon plant, Westvaco performed compliance demonstration tests on all point source emission units as required by the PSD permit. The No. 12 Activation Kiln (Emission Point #02) was unable to meet the BACT limits for particulate matter ( $PM_{10}$ ) and phosphoric acid ( $H_3PO_4$ ) while the No. 11 Drying Kiln (Emission Point #03) was unable to meet the BACT limits for carbon monoxide (CO). For all other pollutants and emission points, Westvaco was able to successfully meet the BACT limits.

Following these performance tests, Westvaco installed an additional particulate and phosphoric acid control device on the control train for the No. 12 Activation Kiln - a Brink Demister unit. Subsequent testing on Activation Kiln on June 9, 1998 indicates that the facility is now able to meet the BACT limits for  $PM_{10}$  and  $H_3PO_4$  using the new Brinks Demister unit.

The BACT limit for CO on the No. 11 Drying Kiln was based on the conclusion that CO emissions from this source would arise principally from the incomplete combustion of the dryer fuel, natural gas. Recent stack tests have revealed that additional CO is being generated from the activated carbon particles during the drying process, accounting for more than half of the measured CO emissions. With this permit revision, Westvaco is seeking a relaxation of the allowable emission limit for CO from the Drying Kiln. Since this is a significant modification of the previous emission limit, the current application includes a revised BACT analysis for CO and a new ambient air impact analysis for CO.

## 2. PSD Revisions

The proposed permit includes the following revisions that affect PSD/BACT emission limits and requirements in the existing permit:

- i. Addition of a new control device for particulate and phosphoric acid control device on the control train for the No. 12 Activation Kiln - a Brink Demister unit. The demister unit is required to meet an existing PSD BACT limit and must be included in the permit to make operation of the demister state and federally enforceable. The appropriate monitoring, recordkeeping, and reporting requirements have been specified for this device in the proposed permit.
- ii. Relaxation of an existing BACT limit for carbon monoxide - As mentioned previously, the No. 11 Drying Kiln was unable to meet the existing BACT limit for CO. The division has reviewed the revised BACT and ambient air quality analysis submitted by Westvaco and concluded that the proposed relaxation of the CO limit (from 2.44 to 5.64 lb/hr) will not result in any adverse ambient air quality impacts. The division has approved the proposed relaxation and the new BACT emission limit for CO has been included in this permit.

The proposed permit also includes the following revisions that are not PSD or BACT changes:

- iii. Increase in the sawdust feedrate to the activation kiln - The existing permit limits the sawdust feed rate to the No. 12 Activation Kiln to 25,000 lbs/hr with a moisture content of 42% (14,500 lb/hr dry basis). Based upon a review of the recent stack tests results and taking into account the new demister unit, the division has concluded that a higher sawdust feedrate is justified since Westvaco is not requesting higher emission limits for the No. 12 Activation Kiln for any pollutant. The proposed permit limits the sawdust feedrate to 30,000 lbs/hr with 42% moisture content.
- iv. Revised monitoring, recordkeeping, and reporting requirements - Since the issuance of the original PSD permit, a clearer picture of periodic monitoring requirements and gap-filling provisions has emerged with the beginning of Kentucky's Title V program in December 1996. As a result, revised monitoring, recordkeeping, and reporting requirements have been included for every emission point in the proposed permit.
- v. Addition of insignificant activities - Five insignificant activities have been added in the proposed Title V permit.

## 3. BACT Review

Pursuant to State Regulation 401 KAR 51:017, Section 9 (1) and (3), a PSD source shall meet the following requirements,

- i. The proposed source shall apply best available control technology (BACT) for each pollutant that it will have the potential to emit in significant amounts.
- ii. The proposed source shall meet each applicable emissions limitation under Title 401, KAR Chapters 50 to 63, and each applicable emission standard and standard of performance under 40 CFR 60 and 61.

Recent stack tests have revealed CO emissions from the No. 11 Drying Kiln are higher than the currently permitted level (a BACT limit) due to the generation of additional CO from the activated carbon particles during the drying process. Previous estimates of CO were based on the incomplete combustion of natural gas at the drying kiln. With this permit revision, Westvaco is seeking a relaxation of the allowable emission limit for CO from the Drying Kiln. Therefore, a revised BACT review was performed for the drying kiln.

Westvaco has presented in the permit application, a study of the best available control technology for CO emission from the drying kiln (See Exhibit II in the application). The Division has reviewed the proposed control technology in conjunction with information available at U.S. EPA's Clean Air Technology Center (CATC) and the RACT/BACT/LAER Clearinghouse and *concluded that the proposed emission limit for CO qualifies as BACT for this emission unit.* A summary of the previous and proposed control technology is presented below:

EP#	Affected Facility	Pollutant	Control Technology	Control Level	Emission Level (lb/hr)
03	Woodbase Carbon Drying Kiln:				
	Previous Limit	CO	Combustion Control	NA	2.44 lb/hr
	Proposed Limit	CO	Combustion Control	NA	5.64 lb/hr

There are no other applicable emissions limitations under Title 401, KAR Chapters 50 to 65, or under 40 CFR 60, 61 and 63 for the affected facilities listed above.

#### 4. Air Quality Impact Analyses

Westvaco has remodeled CO emissions from the carbon plant incorporating the proposed allowable emission limit for the drying kiln. The purpose of this analysis is to demonstrate that the new level of allowable emissions from the carbon plant will not cause or contribute to air pollution in violation of:

- i. A national ambient air quality standard in an air quality control region; or
- ii. An applicable maximum allowable increase over the baseline concentration in an area.

The latest version of U.S. EPA's Industrial Source Complex Short Term model (ISCST3, Version 97363) was used in the analysis. The ISCST3 model fulfills the requirements of Supplement C of the Guideline on Air Quality Models (Appendix W to 40 CFR Part 51). All parameters used in the modeling analysis for each pollutant has been found to be satisfactory and consistent with the prescribed usage for this model. Per EPA guidance, the ISCST3 model was run in sequential hourly mode using five consecutive years of meteorological data. Surface data used was based on weather observations taken at the National Weather Service (NWS) station in Paducah, Kentucky for the period from 1987 through 1991. Concurrent upper air data was based on radiosonde soundings from the Monett-WSMO station near Springfield, MO. The results of the ISCST3 modeling are summarized below:

Pollutant	Averaging Period	Calculated Impact ( $\mu\text{g}/\text{m}^3$ )	SIL <sup>(1)</sup> ( $\mu\text{g}/\text{m}^3$ )	SMC <sup>(2)</sup> ( $\mu\text{g}/\text{m}^3$ )	PSD Class II Increments ( $\mu\text{g}/\text{m}^3$ )	NAAQS <sup>(4)</sup> ( $\text{mg}/\text{m}^3$ )
CO	1-hour	63.37	2000	NA	NA <sup>(3)</sup>	40
	8-hour	21.09	500	575	NA <sup>(3)</sup>	10

<sup>(1)</sup> Significant Impact Level

<sup>(2)</sup> Significant Monitoring Concentration

<sup>(3)</sup> No Class II increment has been established for CO

<sup>(4)</sup> National Ambient Air Quality standard

The results of the modeling demonstrate that even at the higher permitted CO level, the maximum predicted ground-level concentrations are predicted to be below the Significant Impact Levels for CO. Consequently, no further modeling or full impact analysis was required.

#### 5. CO Emission Limit Revision Conclusion

In conclusion, considering the information presented in the application, the division has made a determination to grant a higher CO limit for the No. 12 Drying Kiln since this review has demonstrated that all applicable requirements under PSD have been satisfied. The Title V permit contains a higher allowable CO limit of 5.64 lbs/hr for Emission Point #03.

#### **D. CREDIBLE EVIDENCE:**

This permit contains provisions which require that specific test methods, monitoring or recordkeeping be used as a demonstration of compliance with permit limits. On February 24, 1997, the U.S. EPA promulgated revisions to the following federal regulations: 40 CFR Part 51, Sec. 51.212; 40 CFR Part 52, Sec. 52.12; 40 CFR Part 52, Sec. 52.30; 40 CFR Part 60, Sec. 60.11 and 40 CFR Part 61, Sec. 61.12, that allow the use of credible evidence to establish compliance with applicable requirements. At the issuance of this permit, Kentucky has not incorporated these provisions in its air quality regulations.